



UNITED STATES PATENT AND TRADEMARK OFFICE

A

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,626	11/13/2003	Peter A. Benson	108298743US	2439
25096	7590	01/24/2006	EXAMINER	
PERKINS COIE LLP			IM, JUNGHWA M	
PATENT-SEA			ART UNIT	
P.O. BOX 1247			PAPER NUMBER	
SEATTLE, WA 98111-1247			2811	

DATE MAILED: 01/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/713,626	Applicant(s) BENSON ET AL.	
	Examiner Junghwa M. Im	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-17 and 19-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-17 and 19-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11/13/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of claims 9-17 and 19-24 in the reply filed on November 8, 2005 is acknowledged. Currently claim 21 is generic since the broadest recited claim 21, encompasses the claim 9.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 9 and 12-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Hikida et al. (US 6657309), hereinafter Hikida.

Regarding claim 9, Fig. 4 of Hikida shows a microfeature workpiece, comprising:

a plurality of first dies [90], wherein individual first dies have a first integrated circuit and a plurality of first pads [a portion connected to an interconnect 94] electrically coupled to the first integrated circuit; and

a plurality of first conductive mating structures [95] at least proximate to the first pads, the first conductive mating structures projecting away from the dies and being configured to interconnect with corresponding complementary second conductive mating structures [85] on second dies [80] which are to be mounted to corresponding first dies (col. 8, lines 33-38).

Regarding claim 12, Fig. 4 of Hikida shows that the first conductive mating structures have generally rectangular configurations.

Regarding claim 14, Fig. 4 of Hikida shows that the first conductive mating structures have male configurations.

Regarding claim 9, Fig. 4 of Hikida shows a microfeature workpiece, comprising:
a plurality of first dies [80], wherein individual first dies have a first integrated circuit and a plurality of first pads [a portion connected to an interconnect 84] electrically coupled to the first integrated circuit; and

a plurality of first conductive mating structures [85] at least proximate to the first pads, the first conductive mating structures projecting away from the dies and being configured to interconnect with corresponding complementary second conductive mating structures [95] on second dies [90] which are to be mounted to corresponding first dies (col. 8, lines 33-38).

Regarding claim 13, Fig. 4 of Hikida shows that the first conductive mating structures include an aperture configured to receive at least a portion of one of the second conductive mating structures.

Regarding claim 15, Fig. 4 of Hikida shows that the first conductive mating structures have female configurations.

Claims 9-10, 13, 16-17 and 20-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Cloud et al. (US 6525413), hereinafter Cloud.

Regarding claim 9, Fig. 3 of Cloud shows a microfeature workpiece, comprising:

a plurality of first dies [20], wherein individual first dies have a first integrated circuit and a plurality of first pads [14b in Fig. 1] electrically coupled to the first integrated circuit; and

a plurality of first conductive mating structures [28] at least proximate to the first pads, the first conductive mating structures projecting away from the dies and being configured to interconnect with corresponding complementary second conductive mating structures [an openings in an IC 10] on second dies [10] which are to be mounted to corresponding first dies (col. 8, lines 33-38).

Regarding claim 10, Fig. 3 of Cloud shows that the first conductive mating structures have generally circular configurations.

Regarding claim 13, Fig. 3 of Cloud shows that the first conductive mating structures include an aperture configured to receive at least a portion of one of the second conductive mating structures.

Regarding claim 16, Fig. 3 of Cloud shows that the first conductive mating structures comprise solder (col. 6, lines 61-63).

Regarding claim 17, Fig. 3 of Cloud shows that the first dies include a first side and a second side opposite the first side; the first pads comprise a plurality of bond-pads on and/or in the first side of the first dies; and the first conductive mating structures are coupled to the bond-pads on the first side of the first dies (col. 6, lines 38-44).

Regarding claim 20, Fig. 3 of Cloud shows that the first conductive mating structures are formed on corresponding first pads.

Regarding claim 21, Fig. 3 of Cloud shows that a microelectronic die [20], comprising an integrated circuit, a plurality of bond-pads [14b in Fig. 1] electrically coupled to the integrated circuit (col. 6, lines 40-44), and a plurality of first conductive mating [28] structures on corresponding bond-pads, the first conductive mating structures projecting away from the die directly from corresponding bond-pads and being configured to interface with corresponding second conductive mating structures [openings in a die 10] on another microelectronic device [10] to which the die is to be mounted.

Regarding claim 22, Fig. 3 of Cloud shows that the first conductive mating structures have generally circular, triangular, or rectangular configurations.

Regarding claim 23, Fig. 3 of Cloud shows that the first conductive mating structures include an aperture configured to receive at least a portion of one of the second conductive mating structures.

Regarding claim 24, Fig. 3 of Cloud shows that the first conductive mating structures have a male or female configuration.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cloud in view of Tonti et al. (US 6114221), hereinafter Tonti.

Regarding claim 11, Fig. 3 of Cloud shows most aspect of the instant invention except “the first conductive mating structures have generally triangular configurations.” Fig. 15 of Tonti shows a mating structure of the semiconductor device wherein the first conductive mating structures have triangular configurations. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to incorporate the teachings of Tonti into the device of Cloud in order to have the first conductive mating structures being generally triangular configurations to accommodate the required specification. Furthermore, it would have been obvious matter of design choice since such a modification would have involved a mere change in the shape of a component. A change in shape is generally recognized as being within the level of ordinary skill in the art. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cloud in view of Sumikawa et al. (US 6362529), hereinafter Sumikawa.

Regarding claim 19, Fig. 3 of Cloud shows most aspect of the instant invention except “the first dies include a third die; the first pads include a second pad and a third pad adjacent to the second pad on the third die; and the first conductive mating structures on the second and third pads are spaced apart from each other by a distance of less than approximately 100 microns.” Fig. 3 of Sumikawa shows a semiconductor device with a mating structure wherein the first dies [1’s] include a third die; the first pads include a second pad and a third pad adjacent to the second pad on the third die; and the first conductive mating structures on the second and third pads are spaced apart from each other by a distance. It would have been

Art Unit: 2811

obvious to one of ordinary skill in the art at the time of the invention was made to incorporate the teachings of Sumikawa into the device of Cloud in order to have the first dies including a third die, the first pads with a second pad and a third pad adjacent to the second pad on the third die, and the first conductive mating structures on the second and third pads are spaced apart from each other by a distance to a larger integrated circuit.

The combined teachings of Cloud and Sumikawa fail to teach that “third pads are spaced apart from each other by a distance of less than approximately 100 microns.” However, it would have been obvious to one of ordinary skill in the art at the time of the invention made to have third pads spaced apart from each other by a distance of less than approximately 100 microns for a compact packaging, since it would have been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only in routine skill in the art. *In re Aller*, 105 USPQ 233.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junghwa M. Im whose telephone number is (571) 272-1655. The examiner can normally be reached on MON.-FRI. 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2811

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jmi

A handwritten signature in black ink, appearing to read 'Eddie Lee', with a large, sweeping loop at the top.

EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800